REMARKS

Claims 49, 51-53, 63-65, 86-90, 101, 105-113, 120-127, 130-134, 137-141, and 144-148 are pending in the present application. Claims 64, 86, 88-90, 101, 108-113, 121-124, 126, and 127 have been amended. The claim amendments incorporate elements of certain dependent claims into independent claims and re-number dependencies. The amendments add no new matter. Reconsideration of the present application is respectfully requested in light of the following remarks.

INTERVIEW

Applicants acknowledge receipt of the Interview Summary for the Interview of November 23, 2004. As set forth in the Interview Summary, during the telephonic and personal (Mr. Storella) interview, all claims were discussed in view of the cited art. During the interview, it was argued that the cited references are non-analogous because these references are not directed to the claimed laser desorption systems and methods. Applicants thank Examiner Alexander for his time.

RESPONSE

Applicants reply to the Outstanding Office Action as set forth below. None of the references cited by the Examiner teaches or suggests the presently claimed invention.

Several methods of mass spectrometry were known at the time of the filing of this application. Many relevant versions involved ionizing an analyte and then determining its mass. Available ionization methods included electrospray, chemical ionization, electron impact ionization and laser desorption/ionization. Time-of-flight mass spectrometry generally involves the acceleration of ionized analyte through an electric field into a flight tube. The present claims refer to laser desorption/ionization time-of-flight mass spectrometry ("LDI TOF-MS"). In particular, they refer to a method of LDI TOF-MS in which the probe surface, at least, comprises a non-metallic material selected from a group of specified materials.

Previously, LDI TOF-MS involved the use of a metal probe, e.g., steel or aluminum, on which the analyte was applied. This probe was introduced into the space between the electrodes that would create the electric field, usually flush with the back-most plate. Up to the time of this invention, no one had used a probe that had a surface comprising the polymeric elements recited in the claims -- polystyrene, polypropylene, polyethylene, polycarbonate, nylon, starch, agarose and dextran.

The Office Action cited art to allegedly show the obviousness of the invention. However, Applicants respectfully submit that none of these references describes a probe for use in laser desorption/ionization, and there was no motivation to modify these probes with such materials as described by the claims, to use them as laser desorption/ionization probes.

Filed herewith is a 37 CFR § 1.132 Declaration of Scot R. Weinberger, an expert in the field of mass spectrometry. Mr. Weinberger has concluded that the art cited by the examiner did not anticipate the invention or render it obvious, for the following reasons. Further details of Mr. Weinberger's opinion are included in the declaration. Mr. Weinberger concludes:

1. In Mr. Weinberger's opinion, Westlake and Brodbelt do not anticipate the invention because they fail to disclose several elements of the claimed invention. First, it does not describe a time-of-flight laser desorption mass spectrometer or its use. Second, the "probe" is not a mass spectrometry probe as that term is understood by persons skilled in the art of mass spectrometry. In common usage, a "mass spectrometry probe" is a solid support on which a sample is placed and which is introduced into the mass spectrometer, where the sample is desorbed and ionized from the probe. That is not the case in Brodbelt. The "probe" is not meant to be inserted into a mass spectrometer of any kind. Rather, the "probe" is inserted into an animal. Because they lack several elements of the present claims, the Westlake and Brodbelt references did not anticipate the invention.
2. In Mr. Weinberger's opinion, the disclosure of the Benninghoven et al. reference did not render the present invention obvious. The teachings of Benninghoven et al. are

motivated by their desire to keep the sample presenting surface outside of the mass spectrometer chamber so as to avoid exposing the analyte to a vacuum. The polymeric foil is thin so that a laser, located outside the mass spectrometer, can strike the back side of the foil, penetrate the foil and desorb analytes on the front side of the foil which faces the opening to the mass spectrometer. The present claims are directed to methods and devices in which the probe is inserted into a mass spectrometer, and a laser strikes the sample presenting surface of a probe to desorb and ionize the analytes. A person of ordinary skill in the art performing laser desorption mass spectrometry would have had no motivation to make a probe of a thin polymer that through which a laser can pass because the laser strikes the sample presenting surface of the probe and is not intended to penetrate the probe. Accordingly, this reference teaches away from using a polymeric foil as a sample carrier in a laser desorption/ionization mass spectrometer.

Furthermore, the carrier foil of Benninghoven et al. does not appear to be rigid and self-supporting, as the claims require. Mr. Weinberger believes that a person of ordinary skill in the art of mass spectrometry would have recognized that a non-rigid or self supporting material is not appropriate for removably inserting into a laser desorption/ionization mass spectrometer. Therefore, there would have been no motivation to use such the thin polymeric foil of Benninghoven et al. as a removably insertable probe for laser desorption/ionization mass spectrometry.

In sum, several elements of the claims are missing in the Benninghoven et al. reference and it would not have been obvious to alter the probe of Benninghoven et al. to incorporate the missing elements or to use the probe as described in the present claims. Therefore, Mr. Weinberger does not believe that the Benninghoven et al. reference made the invention obvious to one of ordinary skill in the art.

3. In Mr. Weinberger's opinion, a person of ordinary skill in the art of mass spectrometry would not have been motivated to use a ceramic probe for sample presentation in laser desorption/ionization time-of-flight mass spectrometry. First,

ceramic is adapted for use in chemical desorption, which requires high heat. That is not the case in laser desorption. Furthermore, at the time the subject patent application was filed persons of ordinary skill in the art of mass spectrometry believed that the introduction of non-conductive materials, such as ceramic or the elements mentioned in the claims, would interfere with the electric field of a time-of-flight device so as to impair the ability to detect desorbed/ionized analytes. Therefore, it would not have been obvious to use ceramic or the materials mentioned in the claims as part of a mass spectrometry probe in laser desorption/ionization time-of-flight mass spectrometry.

4. It is Mr. Weinberger's opinion that it would not have been obvious to use the probe of Cerami in a laser desorption/ionization time-of-flight mass spectrometer as described by Stuke. In particular, persons of ordinary skill in the art would have believed that the use of non-conductive materials such as ceramic or the materials mentioned in the claims would have interfered with the electric field of a time-of-flight device so as to impair the ability to detect desorbed/ionized analytes. Therefore, it would not have been obvious to use the probe of Cerami in a laser desorption/ionization time-of-flight mass spectrometer, as required by the claims.
5. Furthermore, it is Mr. Weinberger's opinion that it would not have been obvious to one of ordinary skill in the art to use the probe of Westlake/Brodbelt in a laser desorption/ionization mass spectrometer. The "probe" of Brodbelt is not a mass spectrometry probe at all, but a probe to be inserted into an animal to sample blood gas. The Brodbelt "probe" is not designed for presenting a sample to a laser desorption/ionization source. Rather, the "probe" is used to collect a sample that is then transmitted by other means (a Teflon tube) to the inlet of a modified gas chromatograph mass spectrometer. Therefore, anyone of ordinary skill in the art of mass spectrometry would have recognized that the Brodbelt "probe" is not appropriate for use in laser desorption/ionization time-of-flight mass spectrometer

and could not be modified for use as such. Therefore, the present invention would not have been obvious over Westlake/Brodbelt in view of Stuke.

Accordingly, withdrawal of the rejections and the allowance of the claims are requested.

CONCLUSION

In view of the foregoing, Applicants believe all claims now pending in this Application are in condition for allowance. The issuance of a formal Notice of Allowance at an early date is respectfully requested.

If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at 925-472-5000.

Respectfully submitted,

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